Organization:	Naval Research Laboratory
Title:	Terrain Properties and Topography from Skylab Altimetry
Period Covered:	Monthly Progress Report, January 1974
EREP Number:	EPN 363
Contract Number:	T-4716B
Principal Investigator:	Allan Shapiro
Date Written:	5 March 1974
Technical Monitor:	Larry York, NASA Johnson Space Center, Code TF6, Houston, Texas 77058

During this period an attempt was made to clarify the relation between the frame time indicated on the processed altimeter data tape and the altimeter range measurements. Telephone conversations with J. McGoogan of Wallops Island, Virginia, J. C. Jones of Martin Marietta Corporation at Denver, Colorado, M. Hurst of Philco Ford, and J. Snyder of JSC both at Houston, Texas, indicated some confusion on the exact timing of the individual range measurements. A change in the conversion from AMT to GMT was also made sometime between SL-2 and SL-3 with a resultant shift of frame time relative to the altimeter range measurements. A further change was made to include system delay in calibration of range measurements, with some uncertainty as to whether they were applied to the SL-3 processed data received by NRL. At present the time for average altitude of SL-2 and SL-3 data will be obtained by shifting frame time by 376 ms. This is based on letter (2/15/74) received from J. C. Jones of Martin Marietta Corporation. Based on same letter a time shift of 512 ms will be applied in SL-4 data. A letter is also expected from J. Snyder of JSC to confirm this time position. Based on telephone conversations with M. Hurst,

it is assumed that corrections for 195 ns system delay have been included in SL-3 and SL-4 data. However there is still some uncertainty of the effective date of change in processing calibrations, and the data of SL-3 may have to be corrected for later, if calibration was not included.

A preliminary analysis of terrain reflecting properties from SL-2 altimeter measurements was completed. As one passes from rough mountaineous and forested areas to smooth desert, valleys, plains and lakes the results indicate that

1. the received power increases over at least a 30 db dynamic range,
2. the pulse shape of the radar return changes from a linear rise time to a pulse that approaches the transmitted pulse shape, and
3. the amplitude distribution of the S & H gate outputs change from an exponential to a double peak distribution.

The above results imply a specular return component which becomes dominant for the smoother areas.

The SL-3 data have shown reliable range lock operation. In pass 28 (GDT 59) the radar return from the salt flats of Utah saturated the AGC loop and indicate a received power at least 20 db above ocean return. Analysis of reflecting properties of SL-3 observed areas will continue in next reporting period. The SL-3 height analysis is waiting for refined Skylab orbit computation from NASA at Wallops Island, Virginia.